# **King County Digital Flood Insurance Rate Map (DFIRM)**

Federal Emergency Management Agency Region X

Overview of Snoqualmie River and Patterson Creek Restudies

King County DFIRM Public Meeting
October 24, 2007



#### Key Technical Tasks for Restudies

- New Bathymetric (Channel) surveys
- New Aerial Photography
- New Topographic Mapping
- Hydrologic Analysis
- Hydraulic Modeling
- Flood Inundation Mapping
- Study Reporting





## New Bathymetric Surveys

- Lower 40 Miles of Snoqualmie River
- Lower 8 Miles of Patterson Creek
- Snoqualmie River Surveyed from boat using GPS and depth sounding equipment
- Patterson Creek cross sections surveyed using hand held RTK system

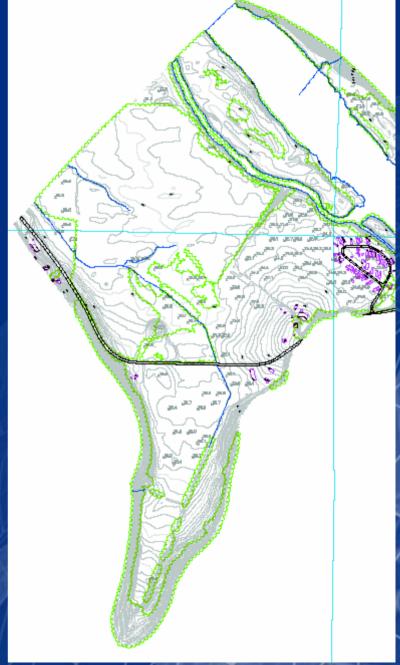




# Topographic Mapping

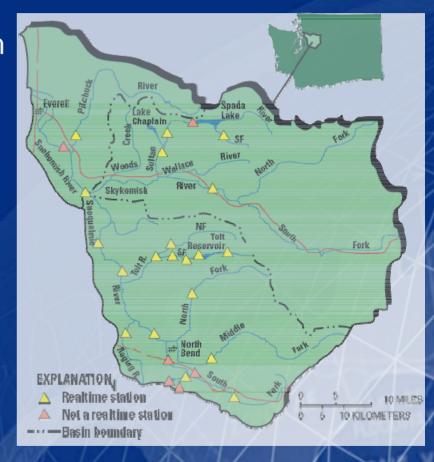
- New Aerial Photography flown in March 2004
- Combined Photogrammetric data with LiDAR data
- Developed new 2-foot contour mapping for over 58 miles of river corridor
- Base maps produced at 1" = 500 foot scale for Snoqualmie and 1" = 200 foot scale for Patterson Creek





#### Hydrologic Analysis - Snoqualmie

- Used available USGS gage data at study boundaries including upstream Snoqualmie River, Skykomish River, Tolt River, Sultan River, and Raging River
- Infilled data by gage transposition or hydrologic modeling
- Focused on 1965 2003 period
- Adjusted discharges to account for:
  - SF Tolt Reservoir
  - Snoqualmie 205 Project





#### Hydrologic Analysis – Patterson Creek

- Used HSPF Hydrologic model calibrated to data collected by King County DNR
- Used current land-use information
- Updated channel storage and attenuation using concurrent hydraulic model information





## Hydraulic Modeling and Analysis

- Used other Study Products as Input (e.g. cross sections, topography, hydrology)
- Unsteady Flow Modeling using U.S. Army Corps of Engineers HEC-RAS Model on Snoqualmie River
- HEC-RAS steady state modeling on Patterson Creek
- Calibration to historic flood events
- Development of 10-, 50-, 100-, and 500-year models
- Used 100-year model to develop floodway



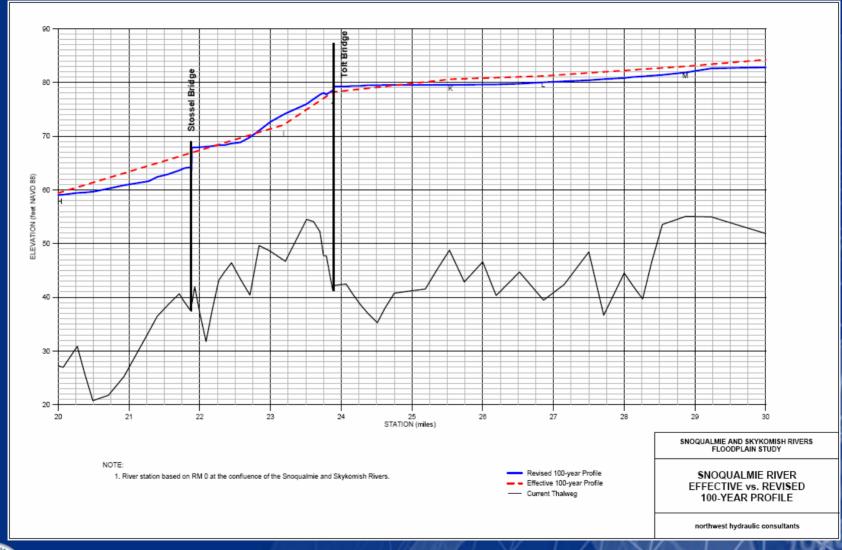
## Flood Inundation Mapping

- Transferred data from hydraulic model to topographic map
- Developed Base Flood Elevations (BFEs)
- Mapped 100-year and 500-year inundation limits
- Plotted flood profiles for 10-, 50-, 100-, and 500-year events
- Mapped new floodway
- Note: FEMA will blend data at all study limits with previous studies



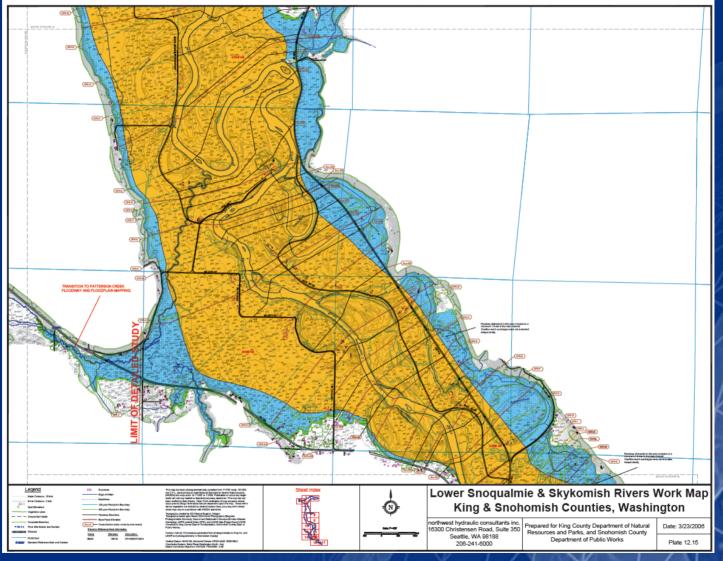


#### Study Results - Profiles





# Study Results – Work Maps





## Study Documentation

- Reviews Completed by FEMA's Regional Map Coordinator
  - Topographic Mapping
  - Hydrologic and Hydraulic Modeling Approach
  - Hydrologic Analysis
  - Hydraulic Model
  - Inundation Mapping
- Study documentation including FIS reports and TSDN submitted in 2006 (Snoqualmie) and 2007 (Patterson Creek)
- FEMA reviews have been completed
- Study results incorporated into draft DFIRM by FEMA

